

## An Observational Study of the Incidence of Cavity Problems after Open Cavity Mastoidectomy and the Perioperative Factors Involved in the Causation of Cavity Problems

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**Received: 25-12-2022 / Revised: 25-01-2023 / Accepted: 28-02-2023**

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**Conflict of interest:** **Nil**

### **Abstract**

**Objective:** To investigate the prevalence of cavity issues following open cavity mastoidectomy and the perioperative variables that contribute to cavity issues.

**Methods:** This 15-month prospective observational study was carried out in the ENT Department of Nalanda Medical College and Hospital in Patna, Bihar. In total, 120 individuals who underwent open cavity mastoidectomy and were included in the study totaled 120 patients.

**Results:** In our study, postoperative cavity issues were 33.33% more common. The gender split among the 40 patients who had cavity issues was 25 men (62.5%) and 15 women (37.5%). The age ranges between 31 and 40 were shown to have the highest frequency of cavities, followed by 11 to 20 and 41 to 50. Of the 40 patients who had cavity issues, sclerotic mastoid represented 72.5%, cellular mastoid 5%, and diploic mastoid 22.5%. The main issue in 38 of the 40 problem cavities (or 95% of them) was prolonged discharge from the mastoid cavity. Wax buildup was found in the cavity in 13 cases (35.5%). In 9 instances (22.5%), vertigo persisted past the early postoperative phase. In 2 cases (5%), perichondritis of the pinna was discovered. Persistence or/development of facial palsy in post-operative period was found in 9 cases (22.5%) and recurrent cholesteatoma was seen only in 6 cases (15%). 3 Cases had postoperative wound infection (7.5%).

**Conclusion:** We draw the conclusion that sclerotic mastoids were slightly more likely to experience cavity difficulties than other types of anaesthesia (general vs. local).

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### **Introduction**

A mastoidectomy is a common surgical treatment used to treat diseases of the middle ear cavity and mastoid. It is typically combined with a tympanoplasty [1]. In cases of chronic ear infections that are resistant to antibiotic treatments, it is regarded as a successful treatment option. The use of a

mastoidectomy to treat chronic drainage or suppuration from otitis media is still up for debate [2, 3], but it is generally accepted as a method of establishing drainage of complex ear infections [4].

The justification for combining a mastoidectomy with a tympanoplasty is that it can enable both the restoration of

the aerated mastoid cavity and the surgical debridement of diseased and devitalized tissues that may cause recurrent middle ear disease [5]. The middle ear system's volume is considerably increased by the existence of an aerated mastoid, which can moderate pressure changes in the middle ear cavity. The mastoid air cell system serves largely as a buffer to pressure changes in the middle ear [6]. Therefore, considerable variations in middle ear pressure in a well-aerated mastoid are expected to have little impact on the middle ear and tympanic membrane [6]. Therefore, if surgery could increase the air volume in a poorly aerated mastoid cavity, the sequelae of chronic negative pressure, including atelectasis and cholesteatoma, could be reduced [7].

Surgery is the main method of cholesteatoma care because it is quite uncommon for any surgeon to treat cholesteatoma medically. MRM is recommended in instances with incurable illness, a posterior canal wall that cannot be rebuilt, insufficient patient follow-up, and poor Eustachian tube function [8]. The purpose of every open cavity procedure is to exteriorize the mastoid cavity for future monitoring of recurrent cholesteatoma, provide drainage for unresectable temporal bone infection and occasionally, provide exposure for difficult to access areas of temporal bone. Supporters of open cavity techniques stress upon the fact that even if some disease is left behind, it can be removed in subsequent visits and also, there is better ventilation of cavity which has a drying effect [9]. Normally, the open cavity heals by secondary intention. Failure of healing and complete epithelialisation leads to various cavity problems such as vertigo, otorrhoea, hearing impairment, wax/debris collection, dependency on doctor for repeated cleaning of cavity, difficulty in wearing hearing aids and residual/ recurrent disease [10]. The aim of the study to find

incidence and causes for postoperative mastoid cavity problems after MRM.

## Methods

After receiving approval from the institutional ethics committee and protocol review committee, this prospective observational study was carried out for 15 months in the department of ENT at the Nalanda Medical College and Hospital in Patna, Bihar, India. In total, 120 individuals who underwent open cavity mastoidectomy and were included in the study totaled 120 patients. All of the patients who were included in this study provided written informed consent, and a purposive sample method was adopted.

## Methodology

Each patient was added to the trial after providing their informed permission and meeting the inclusion requirements. Each subject was assessed in accordance with the study's proforma. They were evaluated mostly based on their symptoms, followed by a cavity check. Every patient received follow-up visits every two weeks for a total of three months.

In this study, a full epithelialization of an open mastoid cavity was given a borderline healing duration of 3-4 months. Therefore, any patient presenting with symptoms after this time was considered to have a cavity problem. Clinical symptoms were examined in relation to the cases. Basic clinical exams were performed. For each case, any of the proven predisposing factors, was determined by cavity examination. When required, investigations like culture and sensitivity of pus were done. Measurement of parameters like facial ridge height, size of cavity and size of meatoplasty were adopted from standard studies conducted by other authors.

In this study 5 cc is taken as the volume of a large mastoid cavity, 3-5 cc, small less than 3 cc, appropriate medical treatments like topical/systemic antibiotics, aural

toilet, steroids and cauterisation were given. Chemical cauterisations of granulations were attempted as an outpatient basis. Patients were followed up at intervals of 2-3 weeks after the treatment to assess the progress. Some cases were admitted in the ward for protracted symptoms and they were given parenteral medication. Rarely cases required surgical management.

## Results

During the study period, 120 patients received open cavity mastoidectomy procedures at the ENT department of the Medical College of Bihar. 40 patients had postoperative cavity issues, and 5 patients

were lost to follow-up before three months. Therefore, according to this study, 33.33% of postoperative cavity problems occur in our system. A 6-year-old kid was the youngest patient to have a mastoidectomy. The earliest patient with a cavity issue was a 9-year-old. A 61-year-old female patient was the oldest to arrive with cavity issues. Of the 120 cases, 82 patients were males, and 38 patients were female. Of the 40 patients who presented with cavity problems, 25 patients were males (62.5%), and 15 patients were females (37.5%). Maximum incidence of cavity problem was found between 31-40 years followed by 11-20 years and 41-50.

**Table 1: Distribution of patients on the basis of Gender and Age**

Gender	No. of cases	%
Male	25	62.5
Female	15	37.5
<b>Age groups (years)</b>		
0-10	1	2.5
11-20	9	22.5
21-30	4	10
31-40	11	27.5
41-50	10	25
Above 50	5	12.5

86 (71.67%) of the 120 instances had sclerotic mastoid, 18 (15%) cellular mastoid, and 16 (13.33%) diploic mastoid. 29 (33.72%) of the 86 sclerotic mastoids developed post-mastoidectomy cavity issues. Nine (56.25%) of the 16 diploic mastoids and two (11.11%) of the 18 cellular mastoids developed postoperative cavity issues, respectively. To put it another way, of the 40 patients who had cavity issues, 72.5% had sclerotic mastoid, 5% had cellular mastoid, and 22.5% had diploic mastoid. 34 surgeries were done under general anaesthesia. All the 120 patients underwent modified radical mastoidectomy.

Of the 40 problem cavities, 38 had prolonged discharge from mastoid cavity as the main problem (95%). Accumulation of wax in the cavity was present in 13

cases (35.5%). Vertigo persisting beyond the immediate postoperative period was present in 9 cases (22.5%). Perichondritis of pinna was found in 2 case (5%). Persistence or/development of facial palsy in post-operative period was found in 9 cases (22.5%) and recurrent cholesteatoma was seen only in 6 cases (15%). 3 Cases had postoperative wound infection (7.5%).

This study found that 19 out of the 120 cases had a sizable post-operative cavity. In light of this, out of the 40 postoperative mastoid cavity issues, 9 instances had a big postoperative cavity, 30 cases had a high facial ridge, 4 cases had meatoplasty stenosis, 27 cases had exposed middle ears and eustachian tubes, and 27 cases had postoperative granulations.

## Discussion

Forty individuals in the current study experienced post-operative mastoid cavity issues. Consequently, this study found that 33.33% of the population experienced cavity issues. Kos et al had 30% cavity difficulties after mastoidectomy, while Sade et al had 28% cavity problems [11, 12]. 26.6% of the mastoid cavities in Khan et al were problematic [13]. As a result, the incidence of cavity issues in this study is practically comparable to that of earlier investigations [13]. According to this study, the age range between 31 and 40 years old had the highest frequency of cavities, followed by 11 to 20 years and 41 to 50 years. In their study, Vaid et al. came to the same conclusions [14]. But Vartianen had different observations. Vartianen had maximum incidence between 20 and 30 years [15]. In the study 75% of patients with high facial ridge had cavity problems. A study conducted by Sade et al this was 80% [10]. Almost same value was also obtained by Vaid et.al [14]. This finding points to the need of lowering the facial ridge upto the level of floor of external auditory canal. On doing so adequate care should be taken to avoid injury to facial nerve, especially in cellular mastoids, where one can expect extensive pneumatisation onto the perifacial and retrofacial cell tracts with a deep mastoid tip. Exposed middle ear and eustachian tube areas were found to be a significant factor causing postoperative discharge from the cavity. This was proven by all the previous studies conducted by Sade et al and Castreillion et al, only 18.18% grafted cases had cavity problems whereas 30.35% cases had cavity problems when grafting was not done [11, 16]. Meatoplasty stenosis was found only in 10% cases. According to Sade et al, only 30% of their patients with meatoplasty stenosis attained dry cavity [11]. Vartianen et al had 27.8% cases of meatoplasty stenosis [15].

### **Conclusion**

We get to the conclusion that the frequency of cavity issues varies

depending on the kind of anaesthesia (general/local). Sclerotic mastoids were marginally more likely to experience cavity issues. This investigation identified the primary cavity issue as persistent cavity discharge. The middle ear and mastoid should be completely free of infection. To achieve a dry cavity, the face ridge must be sufficiently depressed.

### **Source of support: NIL**

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